In the Claims

1. (Previously Presented) A halftone processor for converting a gray scale image comprising a plurality of m-bit pixels to a halftoned image comprising a plurality of n-bit pixel images, where m > n, the processor comprising:

a memory storing a stochastic screen, the stochastic mask being a stochastic screen constrained by a checkerboard pattern, the checkerboard pattern constrained stochastic screen comprising a set of threshold values, each threshold value in the checkerboard pattern constrained stochastic screen corresponding to a gray level, each threshold value corresponding to a gray level between a first gray level (g_{s1}) and a second gray level (g_{s2}) being positioned in the checkerboard pattern constrained stochastic screen at a pixel position corresponding to a black pixel position in the checkerboard pattern, each threshold value corresponding to a gray level between the second gray level (g_{s2}) and a third gray level (g_{s3}) being positioned in the checkerboard pattern constrained stochastic screen at a pixel position corresponding to a white pixel position in the checkerboard pattern, the first gray level (g_{s1}) being greater than the second gray level (g_{s2}), the second gray level (g_{s2}) being greater than the third gray level (g_{s3}), the third gray level (g_{s3}) corresponding to a black dither of 50% or less for gray levels (g_s) wherein $x < g_s < y$, x corresponding to 100% black, y corresponding to 0% black; and

a comparator receiving the gray scale image and the set of threshold values corresponding to the checkerboard pattern constrained stochastic screen, the comparator comparing, on a pixel-by-pixel basis, a value of each pixel in the gray scale image to a corresponding threshold value in the checkerboard pattern constrained stochastic screen to produce the halftoned image.

2. (Original) The processor of claim 1, wherein the halftoned image comprises a plurality of 1-bit pixels.

3. (Previously Presented) The processor of claim 1, wherein the first gray level (g_{s1}) corresponds to approximately a 5% black dither and the second gray level (g_{s2}) corresponds to approximately a 40% black dither.

4. (Previously Presented) The processor of claim 1, wherein the second gray level (g_{s2}) corresponds to approximately a 40% black dither and the third gray level (g_{s3}) corresponds to approximately a 50% black dither.

5. (Previously Presented) The processor of claim 1, wherein the first gray level (g_{s1}) corresponds to approximately a 5% black dither, the second gray level (g_{s2}) corresponds to approximately a 40% black dither and the third gray level (g_{s3}) corresponds to approximately a 50% black dither.

6. (Previously Presented) A method of generating a halftone screen for converting an image received at d levels, for reproduction at c levels, where d > c, the method, in optional sequence, including:

generating a first initial stochastic screen pattern for a first gray level, the initial stochastic screen pattern being constrained by a checkerboard pattern such that a black pixel in the first initial checkerboard pattern constrained stochastic screen pattern is positioned in the first initial checkerboard pattern constrained stochastic screen pattern at a pixel position corresponding to a black pixel position in the checkerboard pattern;

generating a plurality of subsequent first checkerboard pattern constrained stochastic screen patterns, each subsequent first checkerboard pattern constrained stochastic screen pattern corresponding to a specific gray level that is darker than the first gray level and is lighter than a second gray level, the second gray level being darker than the first gray level, each subsequent first checkerboard pattern constrained stochastic screen pattern maintaining an arrangement of black pixels of the first initial checkerboard pattern constrained stochastic screen pattern, each subsequent first checkerboard pattern constrained stochastic screen pattern including a number of additional black pixels such that a total number of black pixels in a subsequent first checkerboard pattern constrained stochastic screen pattern is greater than a number of

black pixels in the initial checkerboard pattern constrained stochastic screen pattern, each additional black pixel in the subsequent first checkerboard pattern constrained stochastic screen patterns being positioned in the subsequent first checkerboard pattern constrained stochastic screen pattern at a pixel position corresponding to a black pixel position in the checkerboard pattern;

generating a second checkerboard pattern constrained stochastic screen pattern, the second checkerboard pattern constrained stochastic screen pattern corresponding to the second gray level, the second checkerboard pattern constrained stochastic screen pattern maintaining the arrangement of black pixels of the first initial checkerboard pattern constrained stochastic screen pattern, the second checkerboard pattern constrained stochastic screen pattern including a number of additional black pixels such that a total number of black pixels in the second checkerboard pattern constrained stochastic screen pattern is greater than a number of black pixels in the initial checkerboard pattern constrained stochastic screen pattern, each additional black pixel in the second checkerboard pattern constrained stochastic screen patterns being positioned in the second checkerboard pattern constrained stochastic screen pattern at a pixel position corresponding to a black pixel position in the checkerboard pattern; and

generating a plurality of subsequent second checkerboard pattern constrained stochastic screen patterns, each subsequent second checkerboard pattern constrained stochastic screen pattern corresponding to a specific gray level that is darker than the second gray level and is lighter than a third gray level, the third gray level being darker than the second gray level, each subsequent second checkerboard pattern constrained stochastic screen pattern maintaining an arrangement of black pixels of the second checkerboard pattern constrained stochastic screen pattern, each subsequent second checkerboard pattern constrained stochastic screen pattern including a number of additional black pixels such that a total number of blacks in a subsequent second checkerboard pattern constrained stochastic screen pattern is greater than a number of black pixels in the second checkerboard pattern constrained stochastic screen pattern, each additional black pixel in the subsequent second checkerboard pattern constrained stochastic screen patterns being positioned in the subsequent second checkerboard

pattern constrained stochastic screen patterns at a pixel position corresponding to a white pixel position in the checkerboard pattern.

7. (Original) The method of claim 6, wherein the first gray level corresponds to approximately a 5% black dither and the second gray level corresponds to approximately a 40% black dither.

8. (Original) The method of claim 6, wherein the second gray level corresponds to approximately a 40% black dither and the third gray level corresponds to approximately a 50% black dither.

9. (Previously Presented) A method for converting a gray scale image received at d levels, for reproduction at c levels, where d > c, the method, in optional sequence, including:

receiving the gray scale image including a plurality of pixels; and

comparing, on a pixel-by-pixel basis, a value of each of the pixels in the gray scale image to a corresponding threshold value in a stochastic screen, the stochastic screen being constrained by a checkerboard pattern, the checkerboard pattern constrained stochastic screen comprising a set of threshold values, each threshold value in the checkerboard pattern constrained stochastic screen corresponding to a gray level, each threshold value corresponding to a gray level between a first gray level (g_{s1}) and a second gray level (g_{s2}) being positioned in the checkerboard pattern constrained stochastic screen at a pixel position corresponding to a black pixel position in the checkerboard pattern, each threshold value corresponding to a gray level between the second gray level (g_{s2}) and a third gray level (g_{s3}) being positioned in the checkerboard pattern constrained stochastic screen at a pixel position corresponding to a white pixel position in the checkerboard pattern, the first gray level (g_{s1}) being greater than the second gray level (g_{s2}), the second gray level (g_{s2}) being greater than the third gray level (g_{s3}, the third gray level (g_{s3}) corresponding to a black dither of 50% or less for gray levels (g_s) wherein $x < g_s < y$, x corresponding to 100% black, y corresponding to 0% black.

10. (Previously Presented) The method of claim 9, wherein the first gray level (g_{s1}) corresponds to approximately a 5% black dither and the second gray level (g_{s2}) corresponds to approximately a 40% black dither.

11. (Previously Presented) The processor of claim 9, wherein the second gray level (g_{s2}) corresponds to approximately a 40% black dither and the third gray level (g_{s3}) corresponds to approximately a 50% black dither.

12. (Previously Presented) The processor of claim 9, wherein the second gray level (g_{s2}) corresponds to approximately a 40% black dither.

13. (Previously Presented) The processor of claim 9, wherein the first gray level (g_{s1}) corresponds to black dither of less than 15%.

14. (Previously Presented) The processor of claim 1, wherein the second gray level (g_{s2}) corresponds to approximately a 40% black dither.

15. (Previously Presented) The processor of claim 1, wherein the first gray level (g_{s1}) corresponds to black dither of less than 15%.